

**Notes on the biology of three Riodinine species:
Nymphidium lisimon attenuatum, *Phaenochitoniasagaris satnius*, and *Metacharis ptolomaeus* (Lycaenidae: Riodininae)**

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Abstract. Observations are presented on the immature biology of three riodinine species from southeast Brazil: *Nymphidium lisimon attenuatum*, *Phaenochitoniasagaris satnius*, and *Metacharis ptolomaeus*. *N. lisimon attenuatum* was found to be myrmecophilous while *P. sagaris satnius* larvae inhabit rolled leaves. Based on observations of oviposition behaviour, I suggest that *M. ptolomaeus* larvae are solitary and non myrmecophilous.

The purpose of this paper is to present data on the biology of three riodinine species from southeast Brazil; *Nymphidium lisimon attenuatum* Stichel, *Phaenochitoniasagaris satnius*, (Dalman) and *Metacharis ptolomaeus* (Fabricius). Although these species are not uncommon where found, nothing about their immature biologies has been published to date.

Observations on the first two species were made at Fazenda União, a forest reserve belonging to the Brazilian National Railways at km 140 of the BR101 highway, Rio de Janeiro State. The vegetation is typical of Atlantic tropical lowland forest found in the foothills of the Serra do Mar at about 100 m above sea level. The reserve consists of patches of secondary alternating with areas of primary forest. (fig. 1. *M. ptolomaeus* was recorded from a patch of woods near Barra de São João, an area of transition between the restinga vegetation and the Atlantic forest, described elsewhere. (Callaghan, 1985).

Observations on larval behaviour were made in the field and in the laboratory.

In the following sections, each species is considered separately, with a description of the immature stages followed by a discussion on immature biology.

Nymphidium lisimon attenuatum

Immature stages

Third (?) instar larve (fig. 3): Head light brown. Head, thorax and abdomen covered with short setae. First thoracic segment (T1) with



Fig. 1. Study area at Fazenda União.



Fig. 2. Food plant of *N. lisimon attenuatum*, *Inga* sp.

dark brown dorsal shield and numerous long setae extending cephalad; one lateral spiracle at base of the shield, and two vibratory papillae dorsad beneath edge of the shield. Meso- and meta-thoracic segments (T2, T3) light brown-green mottled. Abdominal segments also light mottled brown-green with a light green irregular band dorsad; spiracles on A1 and A3-A7 ventrally positioned, that on A2 laterally and A8 dorsad and cephalad of the Newcomber's organs. Segments A9 and A10 covered by a dorsal shield with numerous setae around the edge. Head capsul 1 mm; length 10 mm. N = 4.



Fig. 3. Third(?) instar larvae of *N. lisimon attenuatum* with ants.

Discussion

Stichel's subspecies *attenuatum* ranges along the coast in southeast Brazil from Santa Catharina north to southern Bahia. Inland it intergrades with subspecies *epiplatea* Butler. *N. l. attenuatum* is found locally in disturbed forest habitats where the males perch in the afternoon along roads and woods edges. They rest under leaves with the body raised 45 degrees from the leaf surface.

The foodplant at Fazenda União was *Inga* sp. (fig. 2), the same genus associated with my other observations of *Nymphidium* biology. (Callaghan, in prep.) The plant has broad pointed leaves with nectaries at the base and grows commonly in open clearings to a height of 2 meters. The *Nymphidium* larvae feed on the newer growth and at nectaries, instead of older, tougher leaves. The larvae are solitary, feeding on separate leaves, a characteristic of other myrmecophilous species. (Callaghan, 1985) In the laboratory the larvae fed at night, remaining motionless on the foodplant during the day.

In the field the larvae were always associated with tiny ants identified as *Wasmannia aropunctata* (Roger, 1863). These gather in large numbers on and around the larva, effectively hiding it from view, thus apparently affording it some protection against predation. Unlike other ants observed with larvae (i.e. *Campanotus* sp., (Callaghan, 1977), *Wasmannia aropunctata* appear very sluggish, not taking an obvious defensive attitude towards intruders. The consequence of this lack of aggressive ant protection was suggested by all 4 collected larvae being found parasitized by ichneumonoid wasps. (Hymenoptera: Trichogrammatidae).

Close observation of larval behaviour with ants indicated that the Newcombers' organs were eversible, protruding outward during the secretion of honeydew. This physiology is similar to that observed in *Menander felsina* larvae. (Callaghan, 1977) No eversible tubercles were observed, such as those found on *Audre* larvae, (pers. obs), nor were the vibratory papillae observed functioning.



Fig. 4. Food plant of *P. sagaris satnius* fam. Melastomataceae.

Phaenochitonia sagaris satnius

Immature stages

Egg: Color white; shaped like a fat tire, diameter 0.8 mm, height 0.4 mm; micropyle 0.2 mm in diameter with many small perforations; covering egg surface is a network of small ridges forming hexagonal patterns with a small protrusion at each intersection. Duration: 12 days. N = 5.

First instar larva: Color uniform light green, except for head which is slightly darker; larve pubescent with two rows of long black dorsal setae on segments T2 to A7; four long, black setae on first thoracic (T1) segment pointing cephalad, long green lateral setae with one black one found on all thoracic and abdominal segments; spiracles observed lateraldorsad on segments A2 through A8. Segments A9, A10 partially covered by a small tail plate. Length 1.7 mm; head capsul 0.3 mm; duration: 9 days.

Second Instar (Fig. 6): Head light brown, face with many short setae. Thorax and abdomen light green with numerous small white dots; T1 with eight long black setae pointing cephalad; segments T2 to A9 with 1 black and 5 long white lateral setae on each side per segment and 2 black dorsal setae; A10 with 4 long black setae around the edge of the tailplate. Length 2.5 mm, head capsul 0.4 mm; duration 8 days. N = 4.

Third Instar: Color and morphology as in second instar, except spiracles outlined in lighter green. Length 3.5 mm; head capsul 0.6 mm; duration: larvae died after 5 days due to unknown causes. N = 4.

Discussion

P. sagaris satnius is the central Brazilian subspecies ranging from the coast of São Paulo north to Bahia then across the Planalto to Mato Grosso. Northward it intergrades with subspecies *iasis* (Godman) and to the south with subspecies *phrygiana* Stichel.



Fig. 5. Ovum of *P. sagaris satnius* inside rolled leaf, part of which has been cut away.



Fig. 6. *P. sagaris satnius* larvae feeding. Note frass chain.

At Fazenda Uniao a lone female was observed ovipositing about 1500 hours on a shrub identified as belonging to the family Melastomataceae. (fig. 4) She alighted on the rolled leaf tube of an unidentified Heterocera larva, walked to the open end and placed a small cluster of five eggs inside the opening. (fig. 5)

Upon hatching, the larvae moved into a folded foodplant leaf provided for them in the laboratory and proceeded to eat the inner side of the leaf, at the same time attaching the upper and lower leaf halves together with silk. During the second and third instars when the larvae were placed on fresh foodplant, they would fold the leaf over by weaving silken threads across the leaf surface, each slightly tauter than the one placed previously until the increased tension slowly drew the halves of the leaf together. These were then secured by numerous filaments between the upper and lower halves, forming chambers inside the folded leaf. The larvae always remained inside, even when feeding, undoubtedly being thus protected from predation.

The larvae always remained together while feeding, lining up side by side in twos or threes. Frass excreted by the larvae stuck together, forming a long chain behind each individual. (fig. 6) Starting two to three days before molting the larvae would cease feeding until a day after molting. At no time was there any evidence of myrmecophilous organs or any behaviour patterns which would suggest their association with ants.

Metacharis ptolomaeus

Immature stages

Egg: Shiny bronze color, 0.5 mm in diameter, 0.2 mm high. Extending from micropile is a network of raised lines forming hexagonal

figures with a protrusion rising at each intersection. Duration: 11 days.
N = 1

First instar larva: Newly hatched larva light green, nearly white; pubescent with four long setae extending cephalad from the edge of the prothorax and six equally long setae extending to the rear from the anal plate. Dorsad two rows of setae, a pair to a segment, from T2 to A7, and numerous additional setae extending laterally from the lower edge of each segment. Length 1 mm; head capsule 0.13 mm.

Discussion

M. ptolomaeus inhabits the coast and adjacent mountains in south-east Brazil. It is particularly common in coastal woods and "restinga" vegetation.

A single female was observed ovipositing in a small woods near Barra de São João, Rio de Janeiro State. She laid a single egg at the base of a petiole of a leaf on a small tree identified as *Lacistema* sp. (Flacourtiaceae). As no ant species normally associated with myrmecophilous riodinine species were found on the foodplant, and only a single egg was laid, this would suggest that the larvae of *Metacharis ptolomaeus* are solitary but not myrmecophilous. Unfortunately, the larva died before fresh foodplant could be obtained.

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